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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,052	12/12/2003	Jari Parviainen	879A.0015.U1(US)	2487

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HARRINGTON & SMITH, LLP
4 RESEARCH DRIVE
SHELTON, CT 06484-6212

EXAMINER

CLEARY, THOMAS J

ART UNIT	PAPER NUMBER
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2111

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/735,052

Applicant(s)

PARVIAINEN ET AL.

Examiner

Thomas J. Cleary

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 20031212.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. The requirement for restriction is hereby vacated in view of Applicant's traversal and the status of the instant claims and their current scope. The Examiner reserves the right to impose restriction at a further time should Applicant amend the claims to diverge significantly in their scope.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 4, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Number 6,662,260 to Wertheim et al. ("Wertheim") and US Patent Number 6,467,003 to Doerenberg et al. ("Doerenberg").

4. In reference to Claim 1, Wertheim discloses a method for adapting a bus of a system to data traffic, which system comprises a plurality of functional units each having

a processing unit and bus interface unit (See Figure 9 Numbers 110, 112, 114, and 116), wherein said functional units are divided into at least two sets so that the functional units of a single set are interfaced with a separate sub-bus of their own (See Figure 9), and said system further comprises a switching unit to unite different sub-buses into a more extensive bus (See Figure 9 Numbers 130, 140, and 150), the method comprising steps; checking whether data has to be transferred across said switching unit from one sub-bus to another, uniting the sub-buses in question if the result from the preceding step is positive, separating the sub-buses in question again when the transfer, for which the sub-buses were united, is completed, and keeping a particular sub-bus separated from the other sub-buses if there is no data transfer need therefrom across the switching unit in either direction (See Column 4 Line 40 – Column 5 Line 14). Wertheim does not disclose data being transferred through said bus in time slots recurring in accordance with a certain time frame. Doerenberg teaches the use of time division multiplexing, in which data is transferred in slots recurring in accordance with a certain time frame (See Column 8 Lines 34-39).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the time division multiplexing of Doerenberg in the bus system of Wertheim, resulting in the invention of Claim 1, in order to insure that each function has guaranteed and timely access to the bus without negatively affecting any other functions (See Column 8 Lines 34-39 of Doerenberg).

5. In reference to Claim 3, Wertheim and Doerenberg disclose the limitations as applied to Claim 1 above. Doerenberg further teaches the use of a table drawn up beforehand to determine whether data has to be transferred in a certain time slot (See Column 35 Line 65 – Column 36 Line 23).

6. In reference to Claim 4, Wertheim and Doerenberg disclose the limitations as applied to Claim 1 above. Wertheim further discloses that the clock signals of each sub-bus are synchronized, and thus the uniting of the sub-buses in the combination will occur when a time-slot is changing (See Figure 2 'CLOCK').

7. In reference to Claim 7, Wertheim discloses a bus structure of a system comprising a plurality of functional units each having a processing unit and bus interface unit (See Figure 9 Numbers 110, 112, 114, and 116), wherein to increase a transfer capacity of the bus, it comprises at least two sub-buses to each of which there is interfaced a set of said functional units (See Figure 9), the bus structure further comprising a switching unit to unite said sub-buses into a more extensive bus (See Figure 9 Numbers 130, 140, and 150) and a power management unit to minimize energy consumption of the bus structure (See Column 4 Lines 50-64). Wertheim does not disclose data being transferred through said bus in time slots recurring in accordance with a certain time frame. Doerenberg teaches the use of time division multiplexing, in which data is transferred in slots recurring in accordance with a certain time frame (See Column 8 Lines 34-39).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the time division multiplexing of Doerenberg in the bus system of Wertheim, resulting in the invention of Claim 7, in order to insure that each function has guaranteed and timely access to the bus without negatively affecting any other functions (See Column 8 Lines 34-39 of Doerenberg).

8. In reference to Claim 9, Wertheim and Doerenberg disclose the limitations as applied to Claim 7 above. Doerenberg further teaches that the switching unit comprises a switching part (See Figure 9 Numbers 130, 140, and 150) and a switch control unit (See Figure 9 Number 524) to unite sub-buses.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wertheim and Doerenberg as applied to Claim 1 above, and further in view of US Patent Application Publication Number 2004/0128413 to Chelsea et al. ("Chelsea").

10. In reference to Claim 5, Wertheim and Doerenberg disclose the limitations as applied to Claim 1 above. Wertheim and Doerenberg do not disclose that the clock signals of the sub-buses are not synchronized to one another and lengthening, if necessary, a clock cycle of one sub-bus to keep a data transfer within a single time slot in both sub-buses. Chelsea teaches a system in which two sub-buses are not synchronized and in which the clock signal can stretched in order to ensure that data can be transmitted between the buses (See Paragraph 11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the device of Wertheim and Doerenberg with the non-synchronized buses and clock stretching of Chelsea, resulting in the invention of Claim 5, in order to allow devices in order to allow devices in different clock domains to communicate with each other reliably and with low latency (See Paragraphs 5 and 11 of Chelsea).

11. Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wertheim, US Patent Number 5,630,145 to Chen ("Chen"), and US Patent Application Publication Number 2001/0003206 to Pole, II et al. ("Pole").

12. In reference to Claim 2, Wertheim discloses a method for adapting a bus of a system to data traffic, which system comprises a plurality of functional units each having a processing unit and bus interface unit (See Figure 9 Numbers 110, 112, 114, and 116), between said functional units data being transferred through said bus, wherein said functional units are divided into at least two sets so that the functional units of a single set are interfaced with a separate sub-bus of their own (See Figure 9), said system further comprising a switching unit to unite different sub-buses into a more extensive bus (See Figure 9 Numbers 130, 140, and 150). Wertheim does not disclose that the supply voltage of the sub-bus is settable to at least two different levels quantifying a mean data traffic rate for each sub-bus, setting the supply voltage of a sub-bus to the lower one of said two levels if the data traffic rate of the sub-bus is

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smaller than a certain value. Chen teaches reducing the frequency on a bus when the bus activity drops below a certain level (See Column 1 Lines 27-36). Pole teaches that the supply voltage can be lowered when the frequency of the clock is lowered (See Paragraph 14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the device of Wertheim with the reduced frequency and voltage of Chen and Pole, resulting in the invention of Claim 2, in order to save power when the bus is not being used (See Column 1 Lines 30-36 of Chen); and to save further power because the power dissipation of the bus is proportional to the square of the supply voltage (See Paragraph 14 of Pole).

13. In reference to Claim 6, Wertheim, Chen, and Pole disclose the limitations as applied to Claim 2 above. Chen further teaches that the data traffic rate is determined based on the data transfer needs of application processes currently running on the system (See Column 1 Lines 13-36).

14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wertheim and Doerenberg as applied to Claim 7 above, and further in view of US Patent Application Publication Number 2001/0008550 to Takahashi ("Takahashi").

15. In reference to Claim 8, Wertheim and Doerenberg disclose the limitations as applied to Claim 7 above. The bus of Wertheim will inherently include supply voltage

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stabilizers, as the bus would be inoperative if the supply voltage of the bus were to fluctuate. Wertheim and Doerenberg do not disclose that the power management unit comprises a frame synchronization unit. Takahashi teaches a frame synchronization unit for reducing power consumption (See Paragraph 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the device of Wertheim and Doerenberg with the frame synchronization unit of Takahashi, resulting in the invention of Claim 8, in order to reduce power consumption (See Paragraph 2 of Takahashi).

16. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wertheim and Doerenberg as applied to Claim 7 above, and further in view of US Patent Number 6,079,024 to Hadjimohammadi et al. ("Hadjimohammadi").

17. In reference to Claims 10 and 11, Wertheim and Doerenberg disclose the limitations as applied to Claim 7 above. Wertheim further discloses that each of the functional units comprises a bus interface unit (See Figures 1 and 9) and a control unit to store functional units' data transfer information and to arrange for the data transfers (See Column 5 Lines 28-36). Wertheim and Doerenberg do not disclose that the bus interface has a first buffer memory to store data and address information to be sent, a second buffer memory to store received data and address information, as in Claim 10, and that the first and second buffer memories are of the FIFO type, as in Claim 11.

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Hadjimohammadi teaches a bus interface which has a transmit FIFO buffer and a receive FIFO buffer (See Column 4 Lines 3-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the device of Wertheim and Doerenberg with the transmit and receive FIFO buffers of Hadjimohammadi, resulting in the inventions of Claims 10 and 11, in order to allow multiple data transfers to be performed concurrently (See Column 4 Lines 14-24 of Hadjimohammadi).

Priority

18. Based on the "New Application Transmittal Form" filed on 12 December 2003, the Examiner will treat the application as a continuation filed under 35 USC §365.

19. It is noted that this application appears to claim subject matter disclosed in prior Application No. PCT/FI02/00497, filed 7 June 2002. A reference to the prior application must be inserted as the first sentence(s) of the specification of this application or in an application data sheet (37 CFR 1.76), if applicant intends to rely on the filing date of the prior application under 35 U.S.C. 119(e), 120, 121, or 365(c). See 37 CFR 1.78(a). For benefit claims under 35 U.S.C. 120, 121, or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of all nonprovisional applications. If the application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference to the prior application

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must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

If the reference to the prior application was previously submitted within the time period set forth in 37 CFR 1.78(a), but not in the first sentence(s) of the specification or an application data sheet (ADS) as required by 37 CFR 1.78(a) (e.g., if the reference was submitted in an oath or declaration or the application transmittal letter), and the information concerning the benefit claim was recognized by the Office as shown by its inclusion on the first filing receipt, the petition under 37 CFR 1.78(a) and the surcharge under 37 CFR 1.17(t) are not required. Applicant is still required to submit the reference in compliance with 37 CFR 1.78(a) by filing an amendment to the first sentence(s) of the specification or an ADS. See MPEP § 201.11.

20. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Finland on 13 June 2001. It is noted, however, that applicant has not filed a certified copy of the 20011257 application as required by 35 U.S.C. 119(b). Applicant has further claimed priority to international application number PCT/FI02/00497, filed 7 June 2002, but has not submitted a certified copy (See 35 USC §365).

Conclusion

21. The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US Patent Number 4,922,409 to Schoellkopf et al.; PCT Application Publication Number WO 98/34376 to Schutte; US Patent Number 6,405,273

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to Fleck et al.; US Patent Number 5,862,359 to Nozuyama; US Patent Number 6,948,024 to Packer et al.; Japanese Patent Number 2001318879 to Adachi (as translated by US Patent Number 6,959,357); and US Patent Number 4,451,886 to Guest et al. disclose various means for connecting a plurality of sub-buses together into a unified bus. US Patent Number 6,148,356 to Archer et al.; US Patent Number 6,189,062 to Jander et al.; US Patent Number 5,848,249 to Garbus et al.; US Patent Number 5,978,879 to Harumoto et al.; US Patent Number 6,081,863 to Kelley et al.; and PCI-to-PCI Bridge Architecture Specification Revision 1.1 disclose bridging devices for interconnecting sub-buses.

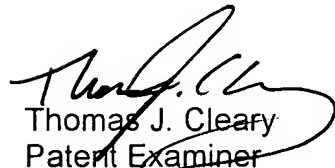
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas J. Cleary whose telephone number is 571-272-3624. The examiner can normally be reached on Monday-Thursday (7-3), Alt. Fridays (7-2).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571-272-3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TJC



Thomas J. Cleary
Patent Examiner
Art Unit 2111



MARK H. RINEHART
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100